

## PATENT COOPERATION TREATY

## PCT

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

REC'D 06 NOV 2000

WIPO


PCT

Applicant's or agent's file reference PCT/97-33	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/US99/17743	International filing date (day/month/year) 05 AUGUST 1999	Priority date (day/month/year) 10 AUGUST 1998
International Patent Classification (IPC) or national classification and IPC IPC(7): B32B 27/30, 27/36 and US Cl.: 428/412, 421, 457, 458, 461, 463, 480, 483, 515, 522		
Applicant MIDWEST RESEARCH INSTITUTE		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 4 sheets.
- ☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority. (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).
- These annexes consist of a total of 1 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of report with regard to novelty, inventive step or industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand  08 MARCH 2000	Date of completion of this report  08 SEPTEMBER 2000
Name and mailing address of the IPEA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer  RAMSEY ZACHARIA Telephone No. (703) 308-0651

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US99/17743

## I. Basis of the report

## 1. With regard to the elements of the international application:\*

☐ the international application as originally filed☒ the description:

pages (See Attached)

, as originally filed

pages , filed with the demand

pages , filed with the letter of

☒ the claims:

pages (See Attached)

, as originally filed

pages , as amended (together with any statement) under Article 19

pages , filed with the demand

pages , filed with the letter of

☒ the drawings:

pages (See Attached)

, as originally filed

pages , filed with the demand

pages , filed with the letter of

☒ the sequence listing part of the description:

pages (See Attached)

, as originally filed

pages , filed with the demand

pages , filed with the letter of

## 2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).☐ the language of publication of the international application (under Rule 48.3(b)).☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

## 3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in printed form.☐ filed together with the international application in computer readable form.☐ furnished subsequently to this Authority in written form.☐ furnished subsequently to this Authority in computer readable form.☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.4. ☒ The amendments have resulted in the cancellation of:☒ the description, pages NONE☒ the claims, Nos. NONE☒ the drawings, sheets/fig NONE5. ☒ This report has been drawn as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).\*\*

\* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

\*\*Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US99/17743

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement****1. statement**

Novelty (N)	Claims <u>1-11</u>	YES
	Claims <u>NONE</u>	NO
Inventive Step (IS)	Claims <u>NONE</u>	YES
	Claims <u>1-11</u>	NO
Industrial Applicability (IA)	Claims <u>1-11</u>	YES
	Claims <u>NONE</u>	NO

**2. citations and explanations (Rule 70.7)**

Claims 1-11 lack an inventive step under PCT Article 33(3) as being obvious over US 4,645,714 A (ROCHE et al). US 4,645,714 A teaches a laminate comprising a silver layer on a polymer substrate and protective film containing ultraviolet stabilizers deposited over silver layer. US 4,645,714 A does not explicitly teach the required thickness of the protective layer. However, US 4,645,714 A does not teach away from the claimed range and increasing the thickness of this layer would be obvious to one of ordinary skill in applications where additional protection is desired. Furthermore, it would be obvious to one of ordinary skill to apply the protective layer by any suitable means.

Claim 1-11 meet the criteria set out in PCT Article 33(2), because the prior art does not explicitly teach the claimed thickness of the protective layer. Furthermore claims 1-11 meet the criteria set out in PCT Article 33(4) since they are directed to silver mirrors that are known to have industrial applications.

----- NEW CITATIONS -----

NONE

**Supplemental Box**

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: Boxes I - VIII

Sheet 10

**I. BASIS OF REPORT:**

This report has been drawn on the basis of the description,  
page(s) 1-8, as originally filed.  
page(s) NONE, filed with the demand.  
and additional amendments:  
NONE

This report has been drawn on the basis of the claims,  
page(s) NONE, as originally filed.  
page(s) NONE, as amended under Article 19.  
page(s) NONE, filed with the demand.  
and additional amendments: :  
Page 9, filed with the letter of 15 August 2000.

This report has been drawn on the basis of the drawings,  
page(s) 1-4, as originally filed.  
page(s) NONE, filed with the demand.  
and additional amendments:  
NONE

This report has been drawn on the basis of the sequence listing part of the description:  
page(s) NONE, as originally filed.  
pages(s) NONE, filed with the demand.  
and additional amendments:  
NONE

5. (Some) amendments are considered to go beyond the disclosure as filed:  
NONE

OL

**PCT**

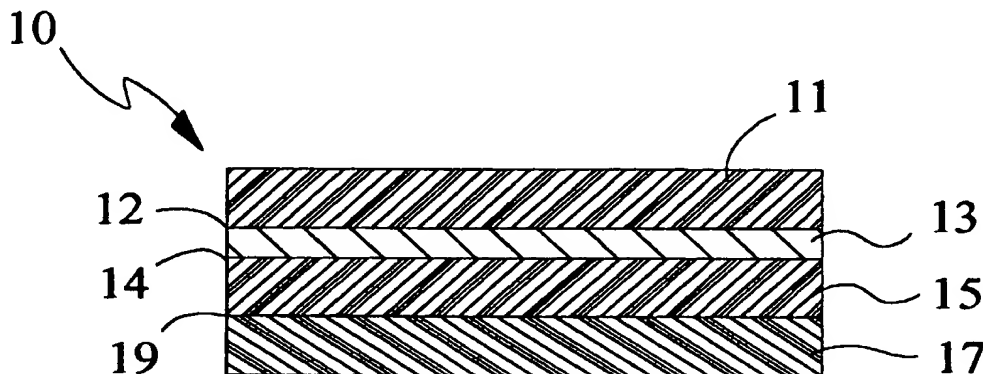
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International Bureau



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<b>(51) International Patent Classification <sup>6</sup> :</b> <b>B32B 27/7</b>		<b>A1</b>	<b>(11) International Publication Number:</b> <b>WO 00/07818</b>
			<b>(43) International Publication Date:</b> 17 February 2000 (17.02.00)
<b>(21) International Application Number:</b> PCT/US99/17743		<b>(74) Agent:</b> RICHARDSON, Ken; Assistant Chief Patent Counsel, National Renewable Energy Laboratory, 1617 Cole Boulevard, Golden, CO 80401 (US).	
<b>(22) International Filing Date:</b> 5 August 1999 (05.08.99)			
<b>(30) Priority Data:</b> 60/095,884 6 August 1998 (06.08.98) US		<b>(81) Designated States:</b> AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).	
<b>(63) Related by Continuation (CON) or Continuation-in-Part (CIP) to Earlier Application</b> US 60/095,884 (CON) Filed on 6 August 1998 (06.08.98)		<b>Published</b> With international search report. With amended claims.	
<b>(71) Applicant (for all designated States except US):</b> MIDWEST RESEARCH INSTITUTE [US/US]; 425 Volker Boulevard, Kansas City, MO 64110 (US).			
<b>(72) Inventors; and</b> <b>(75) Inventors/Applicants (for US only):</b> JORGENSEN, Gary, J. [US/US]; 13662 Douglas Ranch Drive, Pine, CO 80470-9534 (US). GEE, Randy [US/US]; 13991 West 54th Avenue, Arvada, CO 80002 (US). KING, David, E. [US/US]; 13427 West Exposition Drive, Lakewood, CO 80228 (US).			

**(54) Title:** A DURABLE CORROSION AND ULTRAVIOLET-RESISTANT SILVER MIRROR



**(57) Abstract**

In a silver mirror (10) having a polymeric substrate (11), a thin specular-reflective silver layer (13) overlying the substrate and bonded thereto, and a thin protective layer of film-forming polymer (15) overlying the exposed surface of the silver layer (14), the protective layer firmly adherently bonded thereto, the improvement is provided, comprising an ultraviolet absorbing polymer film (17) adhered to the exposed surface of the protective layer (19).

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EE	Estonia	LR	Liberia	SG	Singapore		

## AMENDED CLAIMS

[received by the International Bureau on 13 December 1999 (13.12.99);  
original claims 1-3 and 8 amended; remaining claims unchanged (1 page)]

1. In a silver mirror comprising a polymeric substrate, a thin specular-reflective silver layer overlying the substrate and bonded thereto, and a thin protective layer of a film-forming polymer overlying an exposed surface of the silver layer, the protective layer firmly  
5 adherently bonded thereto, the improvement comprising an ultraviolet absorbing polymer film having a thickness in the range of 40 - 60 g/m<sup>2</sup> (2 - 8 mil) adhered to the surface of the protective layer.
2. The silver mirror of claim 1, wherein the ultraviolet absorbing film is an acrylic polymer.
3. The silver mirror of claim 1, wherein the ultraviolet absorbing film is a polymer selected  
10 from the group consisting of polycarbonate, polyester, polyethylene, naphthalate and fluoropolymer.
4. The silver mirror of claim 1, wherein the ultraviolet absorbing polymer film is adhered to the exposed surface of the protective layer by means of an adhesive.
5. The silver mirror of claim 1, wherein the ultraviolet absorbing polymer film is adhered to  
15 the exposed surface of the protective layer by means of a solvent weld.
6. The silver mirror of claim 1, wherein the ultraviolet absorbing polymer film is adhered to the exposed surface of the protective layer by means of a thermal weld.
7. The silver mirror of claim 1, wherein the ultraviolet absorbing polymer film is adhered to the exposed surface of the protective layer by means of an ultrasonic weld.
- 20 8. A method for making a silver mirror, comprising the steps of:
  - (a) providing a polymeric substrate;
  - (b) bonding a specular-reflective silver layer to the substrate;
  - (c) bonding a thin protective layer of a film-forming polymer to the silver layer; and
  - (d) adhering an ultraviolet absorbing polymer film having a thickness in the range of 40 -  
25 60 g/m<sup>2</sup> (2 - 8 mil) to the protective layer.
9. The method of claim 8 wherein the ultraviolet absorbing polymer is acrylic.
10. The method of claim 8 wherein the ultraviolet absorbing polymer is selected from the group consisting of polycarbonate, polyester, polyethylene, naphthalate or fluoropolymer.
11. The method of claim 8 wherein the step of adhering comprises gluing or welding.

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US99/17743

<b>A. CLASSIFICATION OF SUBJECT MATTER</b>														
IPC(6) :B32B 27/7														
US CL :428/412, 421, 457, 458, 461, 463, 480, 483, 515, 522														
According to International Patent Classification (IPC) or to both national classification and IPC														
<b>B. FIELDS SEARCHED</b>														
Minimum documentation searched (classification system followed by classification symbols)														
U.S. : 428/412, 421, 457, 458, 461, 463, 480, 483, 515, 522														
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched														
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)														
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>														
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.												
Y,P	US 5,846,659 A (LOWER et al) 8 December 1998, col. 1-2.	1-11												
Y	US 5,276,600 A (TAKASE et al) 4 January 1994, col. 1, line 53 to col. 4, line 22.	1-11												
Y	US 5,251,064 A (TENNANT et al) 5 October 1993, col. 4, lines 40-50.	1-11												
X	US 5,118,540 A (HUTCHISON) 2 June 1992, col. 3, line 64 to col. 4, line 43, and col. 6, lines 1-21.	1-11												
Y	US 5,063,112 A (GROSS et al) 5 November 1991, col. 1-2.	1-11												
X	US 4,645,714 A (ROCHE et al) 24 February 1987, col. 6, lines 5-41.	1-11												
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.														
<table border="0"> <tr> <td>* Special categories of cited documents:</td> <td>*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</td> </tr> <tr> <td>*A* document defining the general state of the art which is not considered to be of particular relevance</td> <td>*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</td> </tr> <tr> <td>*E* earlier document published on or after the international filing date</td> <td>*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</td> </tr> <tr> <td>*L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</td> <td>*A* document member of the same patent family</td> </tr> <tr> <td>*O* document referring to an oral disclosure, use, exhibition or other means</td> <td></td> </tr> <tr> <td>*P* document published prior to the international filing date but later than the priority date claimed</td> <td></td> </tr> </table>			* Special categories of cited documents:	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention	*A* document defining the general state of the art which is not considered to be of particular relevance	*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone	*E* earlier document published on or after the international filing date	*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art	*L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*A* document member of the same patent family	*O* document referring to an oral disclosure, use, exhibition or other means		*P* document published prior to the international filing date but later than the priority date claimed	
* Special categories of cited documents:	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention													
*A* document defining the general state of the art which is not considered to be of particular relevance	*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone													
*E* earlier document published on or after the international filing date	*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art													
*L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*A* document member of the same patent family													
*O* document referring to an oral disclosure, use, exhibition or other means														
*P* document published prior to the international filing date but later than the priority date claimed														
Date of the actual completion of the international search		Date of mailing of the international search report												
06 SEPTEMBER 1999		20 OCT 1999												
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230		Authorized officer RAMSEY ZACHARIA Telephone No. (703) 305-0503												



# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US99/17743

## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.

## PATENT COOPERATION TREATY

PCT

## NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Assistant Commissioner for Patents  
United States Patent and Trademark  
Office  
Box PCT  
Washington, D.C.20231  
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

<b>Date of mailing</b> (day/month/year) 02 May 2000 (02.05.00)	
<b>International application No.</b> PCT/US99/17743	<b>Applicant's or agent's file reference</b> PCT/97-33
<b>International filing date</b> (day/month/year) 05 August 1999 (05.08.99)	<b>Priority date</b> (day/month/year) 06 August 1998 (06.08.98)
<b>Applicant</b> JORGENSEN, Gary, J. et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:

08 March 2000 (08.03.00)

☐ in a notice effecting later election filed with the International Bureau on:2. The election ☐ was☒ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

<p>The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland</p> <p>Facsimile No.: (41-22) 740.14.35</p>	<p>Authorized officer Pascal Piriou</p> <p>Telephone No.: (41-22) 338.83.38</p>
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Claims

1. In a silver mirror, comprising a polymeric substrate, a thin specular-reflective silver layer overlying the substrate and bonded thereto, and a thin protective layer of film-forming polymer overlying the exposed surface of the silver layer, the protective layer firmly adherently bonded thereto, the improvement, comprising an ultraviolet absorbing polymer film having a thickness in the range of 40-60 g/m<sup>2</sup> (2-8 mil) adhered to the exposed surface of the protective layer.
2. The silver mirror of claim 1, wherein the ultraviolet absorbing film is an acrylic polymer.
3. The silver mirror of claim 1, wherein the ultraviolet absorbing film is a polymer selected from the group consisting of polycarbonate, polyester, polyethylene, polyethylene naphthalate or fluoropolymer.
4. The silver mirror of claim 1, wherein the ultraviolet absorbing polymer film is adhered to the exposed surface of the protective layer by means of an adhesive.
5. The silver mirror of claim 1, wherein the ultraviolet absorbing polymer film is adhered to the exposed surface of the protective layer by means of a solvent weld.
6. The silver mirror of claim 1, wherein the ultraviolet absorbing polymer film is adhered to the exposed surface of the protective layer by means of a thermal weld.
7. The silver mirror of claim 1, wherein the ultraviolet absorbing polymer film is adhered to the exposed surface of the protective layer by means of an ultrasonic weld.
8. A method for making a silver mirror, comprising the steps of:
  - (a) providing a polymeric substrate;
  - (b) bonding a specular-reflective silver layer to the substrate;
  - (c) bonding a thin protective layer of a film-forming polymer to the silver layer; and
  - (d) adhering an ultraviolet absorbing polymer film having a thickness in the range of 40-60 g/m<sup>2</sup> (2-8 mil) to the protective layer.
9. The method of claim 8, wherein the ultraviolet absorbing polymer is acrylic.
10. The method of claim 8, wherein the ultraviolet absorbing polymer is selected from the group consisting of polycarbonate, polyester, polyethylene, polyethylene naphthalate or fluoropolymer.
11. The method of claim 8, wherein the step of adhering comprises gluing or welding.